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BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2014

DME—SIXTH SEMESTER EXAMINATION

REFRIGERATION AND AIR-CONDITIONING

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.
(2) Each question carries **three** marks.
(3) Answers should be brief and straight to the point.

1. Draw *P-V* and *T-S* diagrams for reversed Carnot refrigeration cycle. 1½+1½=3

2. Write three differences between heat pump and refrigerator. 3

3. What are liquid subcooling and vapour superheating? 1½+1½=3

4. Differentiate between wet compression and dry compression. 3

5. Write two prominent refrigerant-absorber pair used in vapour absorption systems. 1½×2=3

6 State any six desirable thermodynamic properties of refrigerants. ½×6=3

7. Why is expansion device used in refrigeration system? 3

8. State the uses of cold storages. 3

9. Draw the radial perimeter air distribution system and indicate its parts. 1½+1½=3

10. What is psychrometric chart? State its uses. 1½+1½=3

PART—B 10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

(4) Use of psychrometric chart is permissible for the examination.

11. Explain Bell-Coleman refrigeration cycle with *P-V* and *T-S* diagrams. 5+5=10

12. A refrigeration system of 15-ton capacity operates on standard vapour compression cycle using refrigerant 22 at an evaporating temperature of 5 °C and condensing temperature of 50 °C. The refrigerant is dry and saturated at the inlet of the compressor. Calculate *(a)* refrigerating effect, and *(b)* mass flow rate. Use the following table : 10

Temperature (in °C)	*Pressure* (in bar)	*Enthalpy* (in kJ/kg)	
		Liquid	*Vapour*
5	5·836	205·9	407·1
50	19·423	263·3	417·7

13. Explain water-lithium bromide refrigeration system with a neat sketch. 5+5=10

14. Explain the following refrigerants : 4+3+3=10

(a) Ammonia

(b) Azeotropes

(c) Brine

15. *(a)* Explain the working of automatic expansion valve with a neat sketch. 2½+2½=5

(b) Explain sealed-type drier with a sketch. 2½+2½=5

16. Explain loop perimeter system and extended plenum system. 5+5=10

17. Humid air at 30 °C dry-bulb temperature and 21 °C wet-bulb temperature is cooled to 20 °C without removal of moisture. Find RH and DPT of air in final state. What is change in enthalpy? 10

18. Explain central air-conditioning system with a neat sketch. 5+5=10

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